

Nebraska.—Lincoln, Lancaster county: slight frosts occurred in this vicinity about the 21st and 22d, but resulted in no serious damage.

North Carolina.—Lenoir, Caldwell county, 23d: the frost of this date killed all tender vegetation, and in some places the cotton crop was injured.

Charlotte: a light frost occurred on the morning of the 23d, causing slight damage to vegetation in the surrounding country.

Wisconsin.—La Crosse, 21st: considerable damage was done to vegetation by the frost of this date.

ICE.

Ice formed in the various states and territories as follows:

Colorado.—Denver, 3d; Fort Garland, 26th.

Connecticut.—Bethel, 29th, 30th.

Dakota.—Fort Bennett, 10th.

Illinois.—Rockford, 21st, 22d; Swanwick, 22d; Mattoon, 22d, 23d. Other instances of ice formation in this state are mentioned in connection with the heavy frosts of the 22d.

Iowa.—Dubuque, 21st.

Maine.—Gardiner, 1st.

Maryland.—Sandy Springs, 17th.

Massachusetts.—Rowe, 12th.

Michigan.—Ionia, 1st, 6th, 11th; Northport, 10th.

Minnesota.—Minneapolis, 22d; Duluth, 11th.

Nebraska.—Genoa, 5th.

New York.—Menand's Station, (near Albany), 1st; Friendship, 17th.

North Carolina.—Lenoir, 23d.

Ohio.—Ruggles, 13th; Wauseon, 13th; Cleveland, 17th.

Pennsylvania.—Pittsburg, 17th.

Vermont.—Woodstock, 14th.

West Virginia.—Wellsburg, 20th.

Wisconsin.—La Crosse, 21st.

PRECIPITATION.

[Expressed in inches.]

The distribution of rainfall over the United States and Canada, for the month of May, 1883, as determined from observations taken at more than six hundred stations, is exhibited on chart iv.

In the first column of the following table is given the average May rainfall in the various districts for several years; in the second column is given the average for May, 1883; and the third column shows the excess or deficiency of May, 1883, as compared with the average of previous years:

Average precipitation for May, 1883.

Districts.	Average for May. Signal-Service observa- tions.		Comparison of May, 1883, with the average for several years.
	For several years.	For 1883.	
	Inches.	Inches.	Inches.
New England.....	3.30	4.77	1.41 excess.
Middle Atlantic states.....	2.96	2.38	0.58 deficiency.
South Atlantic states.....	3.22	6.13	2.91 excess.
Florida peninsula.....	3.50	3.33	0.17 deficiency.
East Gulf.....	4.40	4.37	0.03 deficiency.
West Gulf.....	5.00	3.59	1.50 deficiency.
Rio Grande valley.....	4.06	1.13	2.93 deficiency.
Tennessee.....	3.74	4.28	0.54 excess.
Ohio valley.....	3.85	4.62	0.77 excess.
Lower lakes.....	2.77	5.79	3.02 excess.
Upper lakes.....	3.04	4.49	0.85 excess.
Extreme northwest.....	3.33	1.68	1.65 deficiency.
Upper Mississippi valley.....	4.49	5.17	0.68 excess.
Missouri valley.....	4.40	7.43	3.03 excess.
Northern slope.....	2.79	2.75	0.04 deficiency.
Middle slope.....	3.34	4.43	1.09 excess.
Southern slope.....	2.54	4.45	1.91 excess.
Northern plateau.....	1.03	2.01	0.99 excess.
Middle plateau.....	1.34	0.65	0.69 deficiency.
Southern plateau.....	0.22	0.38	0.16 excess.
North Pacific coast.....	2.38	3.24	0.86 excess.
Middle Pacific coast.....	0.78	3.11	2.33 excess.
South Pacific coast.....	0.20	1.00	0.80 excess.
Mount Washington, N. H.....	6.39	9.10	2.71 excess.
Pike's Peak, Col.....	4.27	2.80	1.47 deficiency.

In Florida, the eastern Gulf states, and northern slope, the

monthly rainfall differs but slightly from the May normal. In the middle Atlantic states, extreme northwest, middle plateau, western Gulf states, and Rio Grande valley, deficiencies, ranging from 0.58 to 2.93, have occurred. In all other parts of the country the rainfall is above the average for May. In the lower lake region and Missouri valley, the excess over the average exceeds 3.00; in the south Atlantic states it is 2.91; and in the southern slope, 1.91. A noteworthy feature of the distribution of rainfall for May, is the unusually large excess over the average, in California, where the precipitation has been greater than for any corresponding month since the establishment of the Signal-Service stations. In northern California, the rainfall was about four times the average amount, or an excess of 2.33; and in southern California, an excess of 0.80 occurred, the monthly precipitation being five times as great as the average for May.

The general distribution of rainfall during the month of May, and the districts of maximum departures from the May normal of each year since 1873, are as follows:

Districts.	Maximum departures.	Year.	Remarks.
		1873...	{ Deficient in the Saint Lawrence valley, lower lakes, and Ohio Valley; excessive in Iowa, Missouri, eastern Kansas, eastern Tennessee, and along the Atlantic sea-board, except near Portland, Maine, and Savannah, Georgia; very large excesses occurred in the Gulf states.
Lower Mississippi valley.....	- 3.50	1874...	{ Excessive in the Saint Lawrence valley, New England, and south Atlantic states; deficient in all other parts of the country.
East Gulf.....	- 2.93		
Ohio valley.....	- 2.79		
Saint Lawrence valley.....	+ 1.30		
New England.....	+ 1.13		
East Gulf.....	- 2.32	1875...	{ Excessive over the northern districts from the upper Mississippi valley to the Saint Lawrence valley, and also in the south Atlantic states; deficient in all other districts.
West Gulf.....	- 2.14		
Tennessee.....	- 1.78		
Saint Lawrence valley.....	+ 1.21	1876...	{ Excessive in the middle Atlantic and Gulf states, Tennessee, upper Mississippi valley, upper lake region, and in Minnesota; in the other districts small deficiencies occurred, varying from 0.05 to 0.95.
West Gulf.....	+ 2.65		
Tennessee.....	+ 2.50		
Upper Mississippi valley.....	+ 1.65		
Ohio valley.....	- 0.95	1877...	{ Excessive in the upper Mississippi and Missouri valleys and in Minnesota; deficient in all districts east of the Mississippi river, and also in the west Gulf states. On the Pacific coast, a slight excess occurs at Portland, Oregon, a slight deficiency at Santa Fé, New Mexico, and normal at San Diego, California.
Lower Missouri valley.....	+ 2.80		
Minnesota.....	+ 2.30		
Upper lakes.....	- 2.22		
Saint Lawrence valley.....	- 2.15		
New England.....	- 1.95	1878...	{ Normal in Minnesota, the lake region, and south Atlantic states; excessive in the middle Atlantic and Gulf states, the upper Mississippi and lower Missouri valleys; deficient in New England, in the Saint Lawrence, Ohio, and upper Missouri valleys, Tennessee, and California.
West Gulf.....	+ 1.79		
Middle Atlantic states.....	+ 1.16		
Missouri valley.....	+ 1.13		
New England.....	- 1.27	1879...	{ Excessive in Minnesota, the upper Mississippi valley, Tennessee, and on the Pacific coast; deficient in the Gulf and Atlantic states, the Saint Lawrence, Ohio, and Missouri valleys, and also in the lake region. Excessive in the Gulf states, Florida, and from Minnesota to the Saint Lawrence valley; normal in Tennessee and in the upper Mississippi valley; deficient from New England to the south Atlantic states, in the Ohio and Missouri valleys, and in California.
Portland, Oregon.....	+ 4.53		
Minnesota.....	+ 2.95		
New England.....	- 2.45		
Middle Atlantic States.....	- 1.95		
Saint Lawrence valley.....	- 1.76	1880...	{ Excessive in the Missouri valley, New England, and west Gulf states; deficient in all other districts except normal in southern California.
Florida.....	+ 3.14		
East Gulf.....	+ 2.50		
Ohio valley.....	- 1.85		
South Atlantic states.....	- 1.71		
Middle Atlantic states.....	- 1.57	1881...	{ Excessive in the Missouri valley, New England, and west Gulf states; deficient in all other districts except normal in southern California.
New England.....	+ 2.04		
West Gulf.....	+ 1.61		
South Atlantic states.....	- 2.27		
East Gulf.....	- 2.22		
North Pacific.....	- 1.66	1882...	{ Deficient from the eastern Rocky mountain slope to the Pacific coast, except a slight excess in Arizona and southern California; excessive in the Rio Grande valley, western Gulf states, extreme northwest, and in all districts east of the Mississippi river, except the south Atlantic states; normal in Florida.
Ohio valley.....	+ 4.57		
Tennessee.....	+ 2.98		
Lower lakes.....	+ 2.75		
Middle Atlantic states.....	+ 2.15		
South Atlantic states.....	- 1.28		
Middle slope.....	- 1.19		

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal-Service stations are shown in the table of average precipitation for May, 1883. Voluntary observers report the following notes in connection with this subject:

Illinois.—Mattoon, Coles county: monthly rainfall, 4.14, or 0.70 below the May average of the last four years.

Table of Excessive, Greatest, and Least Monthly Rainfalls.

Station.	Specially heavy.			Largest monthly.	Smallest monthly.	
	Date.	Amt.	Duration		Station.	Amt.
<i>Alabama.</i>					<i>Arizona.</i>	
Mobile.....	29	5.62	16 hours	8.51	Yuma.....	0.00
Mount Vernon Barracks.....	30	2.83		8.23	Maricopa.....	0.00
<i>Arkansas.</i>					Prescott.....	0.15
Mount Ida.....	19	3.00		10.30	Casa Grande.....	0.24
<i>California.</i>					Fort Verde.....	0.27
Alta.....				6.07	Willcox.....	0.33
Oakland.....	6	2.60			Tucson.....	0.35
San Francisco.....	4, 8	2.09			Phoenix.....	0.44
Benicia Barracks.....	5, 6	2.08			<i>California.</i>	
<i>Canada.</i>					Indio.....	0.00
Montreal.....				6.23	White Water.....	0.00
<i>Colorado.</i>					Ravena.....	0.16
Denver.....	8	2.02			Goshen.....	0.45
<i>Connecticut.</i>					<i>Louisiana.</i>	
New Haven.....	22	3.32			Alexandria.....	0.41
New London.....	22	2.84			<i>Nevada.</i>	
<i>Dakota.</i>					Carlin.....	0.00
Rapid City.....	2	2.05		11.02	Elko.....	0.01
Do.....	7	2.08			Pallisade.....	0.15
Do.....	17, 18	4.40			Pioche.....	0.33
Deadwood.....	2	2.18		10.33	Beowawe.....	0.38
Do.....	17, 18, 19	5.65			Reno.....	0.40
Fort Meade.....	9, 10	2.40		9.61	<i>New Mexico.</i>	
Do.....	18	3.26			Deming.....	0.00
Yankton.....				8.78	Lordsburg.....	0.00
Smithville.....				6.29	Fort Union.....	0.10
<i>Florida.</i>					<i>North Carolina.</i>	
Fort Barrancas.....	30	3.50		7.82	Highlands.....	0.25
Pennacola.....	29, 30	5.31		7.47	Brevard.....	0.45
Key West.....	11	4.85	11 hours		<i>Texas.</i>	
Limona.....	1	2.25			El Paso.....	0.02
<i>Georgia.</i>					Uvalde.....	0.17
Savannah.....	1	3.21			Weimar.....	0.19
<i>Illinois.</i>					San Antonio.....	0.29
Chicago.....				7.32	<i>Utah.</i>	
Ames.....				6.64	Blue Creek.....	0.00
Springfield.....	25	2.28		6.61	Kelton.....	0.10
Peoria.....				6.54	Promontory.....	0.25
Rockford.....				6.39	Terrace.....	0.50
Riley.....	10	2.42		6.18	<i>Virginia.</i>	
Polo.....				6.14	Snowville.....	0.50
Aurora.....				7.23		
Marengo.....	10	2.42		6.18		
Sycamore.....	9	2.55		8.55		
Griggsville.....	25	2.57		6.60		
Greenville.....	17	2.25		6.25		
Golconda.....	20	3.33		7.13		
Mascoutah.....	19	2.00		6.20		
Do.....	25	2.20				
Anna.....				6.64		
<i>Indiana.</i>						
Bluffton.....				7.60		
Logansport.....	18, 19	2.91		7.51		
Wabash.....				6.24		
Richmond.....				6.04		
Laconia.....	20	2.20				
<i>Indian Territory.</i>						
Fort Supply.....				7.84		
<i>Iowa.</i>						
Des Moines.....	13	2.03		9.76		
Indianola.....	25	2.11		7.83		
Logan.....				7.60		
Dubuque.....	9	2.10		7.13		
Humboldt.....				7.12		
Ames.....				7.11		
Fort Madison.....				7.10		
<i>Kansas.</i>						
Rolling Green.....				10.10		
Belle Plain.....				9.25		
Emporia.....	13	3.88		8.90		
Pretty Prairie.....	16, 17	3.58		7.94		
Lawrence.....	13	3.50		7.63		
Leavenworth.....	13	2.44		7.33		
Do.....	24, 25	2.57				
Yates Centre.....	12, 13	2.77		7.05		
Do.....	24, 25	2.33				
Levy.....				6.80		
Fort Leavenworth.....	25	2.80		6.65		
Fort Scott.....	25	2.03		6.54		
Wellington.....				6.53		
Topeka.....	25	2.18		6.42		
Holton.....	13	2.00		6.38		
Oxford.....				6.02		
Clay Centre.....	16, 17	2.02				
Milford.....	13	2.00				
<i>Kentucky.</i>						
Bowling Green.....	21	2.22				
<i>Louisiana.</i>						
New Orleans.....	26	2.41				
<i>Maine.</i>						
Eastport.....	22, 23	3.54		6.60		
Orono.....	24	2.98				
Gardiner.....	23	2.06				
<i>Massachusetts.</i>						
Amherst.....	22	3.68		6.20		
Boston.....	22	3.00				
Westborough.....	22	2.75				
Budley.....	22	2.66				
<i>Michigan.</i>						
Coldwater.....	9, 10	2.85		10.75		
Hilledale.....				8.62		
Marshall.....				8.41		
Mendon.....				8.16		
Traverse City.....				6.67		
Ionia.....				6.43		

Table of Excessive, Greatest, and Least Monthly Rainfalls.—Continued.

Station.	Specially heavy.			Largest monthly.	Smallest monthly.	
	Date.	Amt.	Duration.		Station.	Amt.
<i>Michigan—Continued.</i>					<i>Michigan—Continued.</i>	
Kalamazoo.....				6.38	Lansing.....	6.31
Litchfield.....				6.20	Litchfield.....	6.20
Grand Haven.....				6.02	<i>Missouri.</i>	
<i>Missouri.</i>					Cornings.....	7.68
Ironton.....				7.30	Ironton.....	7.30
Harrisonville.....				7.25	Harrisonville.....	7.25
Savannah.....				6.50	Savannah.....	6.50
Centerville.....				6.45	Centerville.....	6.45
Miami.....				6.29	Miami.....	6.29
Pleasant Hill.....				6.05	Pleasant Hill.....	6.05
<i>Nebraska.</i>					<i>Nebraska.</i>	
Sutton.....	13	3.00		14.18	Sutton.....	14.18
Do.....	17	2.75			Do.....	
Do.....	25	2.80			Do.....	
Omaha.....	8	2.98		11.29	Omaha.....	11.29
Do.....	13	2.48			Do.....	
Peru.....	12, 13	4.20		9.35	Peru.....	9.35
Do.....	10	2.00			Do.....	
Do.....	17	2.00			Do.....	
Clear Creek.....	12, 13	2.21		8.22	Clear Creek.....	8.22
Nebraska City.....	7	2.00		8.15	Nebraska City.....	8.15
Do.....	13	2.14			Do.....	
Johnson.....	13	2.30		6.55	Johnson.....	6.55
Fort Niobrara.....				6.42	Fort Niobrara.....	6.42
De Soto.....	8	2.27			De Soto.....	
Red Willow.....	13	2.25			Red Willow.....	
Utica.....	13	2.10			Utica.....	
<i>New Hampshire.</i>					<i>New Hampshire.</i>	
Mount Washington.....				9.10	Mount Washington.....	9.10
Antrim.....	23	2.00			Antrim.....	
<i>New Jersey.</i>					<i>New Jersey.</i>	
Paterson.....	21, 22, 23	4.39			Paterson.....	
Sandy Hook.....	21, 22	3.15	13 hours		Sandy Hook.....	
Freehold.....	21, 22	2.37			Freehold.....	
<i>New York.</i>					<i>New York.</i>	
Oswego.....				7.03	Oswego.....	7.03
Friendship.....				6.80	Friendship.....	6.80
North Volney.....				6.70	North Volney.....	6.70
Fort Niagara.....				6.68	Fort Niagara.....	6.68
Rochester.....				6.53	Rochester.....	6.53
Buffalo.....	21, 22	2.07		6.45	Buffalo.....	6.45
New York City.....	21, 22	2.31			New York City.....	
Palermo.....	24	2.25			Palermo.....	
Fort Columbus.....	21, 22	2.10			Fort Columbus.....	
Flushing.....	23	2.00			Flushing.....	
<i>North Carolina.</i>					<i>North Carolina.</i>	
Portsmouth.....	1, 2	4.56		10.57	Portsmouth.....	10.57
Do.....	27	4.18			Do.....	
Hatteras.....	1, 2	4.16		7.81	Hatteras.....	7.81
Do.....	27	2.67			Do.....	
Kittyhawk.....				7.76	Kittyhawk.....	7.76
Fort Macon.....	1, 2	2.29		6.67	Fort Macon.....	6.67
Do.....	27	2.95			Do.....	
Chapel Hill.....	22, 23	2.00			Chapel Hill.....	
<i>North Carolina.</i>					<i>North Carolina.</i>	
Halifax.....				8.61	Halifax.....	8.61
<i>Ohio.</i>					<i>Ohio.</i>	
Cleveland.....				6.50	Cleveland.....	6.50
Jacksonburg.....	21	5.10		6.50	Jacksonburg.....	6.50
Do.....	28	2.25			Do.....	
Columbus.....				6.38	Columbus.....	6.38
North Lewisburg.....				6.05	North Lewisburg.....	6.05
<i>Pennsylvania.</i>					<i>Pennsylvania.</i>	
Wellshorough.....	21	2.18		8.81	Wellshorough.....	8.81
Leetsdale.....				6.53	Leetsdale.....	6.53
Franklin.....				6.38	Franklin.....	6.38
Erle.....				6.29	Erle.....	6.29
Fallsington.....	21	2.01			Fallsington.....	
<i>South Carolina.</i>					<i>South Carolina.</i>	
Charleston.....	1, 2	6.38		8.62	Charleston.....	8.62
Yamasse.....				7.82	Yamasse.....	7.82
<i>Tennessee.</i>					<i>Tennessee.</i>	
Memphis.....	30	2.93	8 hours	6.55	Memphis.....	6.55
Ashwood.....	31	2.10			Ashwood.....	
<i>Texas.</i>					<i>Texas.</i>	
Houston.....				6.08	Houston.....	6.08
Galveston.....				6.01	Galveston.....	6.01
Fort Elliott.....	16, 17	3.83			Fort Elliott.....	
Fort Concho.....	19	3.24	8 hours		Fort Concho.....	
Coleman City.....	19	2.22	2 h. 25 m.		Coleman City.....	
Indianola.....	20	2.02	35 min.		Indianola.....	
Brackettville.....	17	2.00			Brackettville.....	
<i>Vermont.</i>					<i>Vermont.</i>	
Newport.....				7.87	Newport.....	7.87
Charlotte.....				6.90	Charlotte.....	6.90
<i>Wisconsin.</i>					<i>Wisconsin.</i>	
Franklin.....				9.36	Franklin.....	9.36
Columbus.....				8.25	Columbus.....	8.25
Sussex.....	9	2.00		7.89	Sussex.....	7.89
Madison.....				7.62	Madison.....	7.62
Ripon.....	9, 10	2.55		6.50	Ripon.....	6.50
Beloit.....				6.42	Beloit.....	6.42

Anna, Union county: monthly rainfall, 6.64, is 0.99 above the May average of the last eight years.

Riley, McHenry county: monthly rainfall, 6.18, is 2.85 above the May average of the last twenty-two years.

Indiana.—Vevay, Switzerland county: monthly rainfall, 3.49, is 1.40 below the May average of the last eight years.

Wabash, Wabash county: monthly rainfall, 6.24, is 2.18 above the May average of the last seven years.

Logansport, Cass county: monthly rainfall, 7.51, is 3.39 above the May average of the last twenty-four years. During that period the largest May rainfall, 8.24, occurred in 1880; the smallest, 1.20, occurred in 1862.

Kansas.—Lawrence, Douglas county: monthly rainfall, 7.63, is 3.56 above the May average of the last fifteen years. The total rainfall for the five months ending May 31, 1883, is 14.07, or 2.25 below the average of the corresponding months of the fifteen years.

Yates Centre, Woodson county: monthly rainfall, 7.05, is 0.53 above the May average of the three preceding years. Rainfall for the spring months of 1883 is 0.33 below the average of the same periods for the three preceding years.

Independence, Montgomery county: monthly rainfall, 5.00, is 0.17 above the May average of eleven years. The largest May rainfall of that period, 10.06, occurred in 1878; the smallest, 0.88, occurred in 1874.

Wellington, Sumner county: monthly rainfall, 6.53, is 1.12 above the May average of the four preceding years. The total rainfall for the five months ending May 31, 1883, is 13.83, or 3.52 above the average of the corresponding months of the last four years.

Maine.—Gardiner, Kennebec county: monthly rainfall, 5.02, is 1.33 above the May average of the last forty-seven years.

Maryland.—Fallston, Hartford county: monthly rainfall, 1.08, is 1.99 below the May average of the last twelve years. The largest May rainfall of that period, 6.47, occurred in 1873; the smallest was that of May, 1883.

Michigan.—Lansing: monthly rainfall, 6.31, is 1.20 above the May average of the last four years.

Missouri.—See report of Professor Nipher, Director of the "Missouri Weather Service," under "notes and extracts."

New Hampshire.—Grafton, Grafton county: monthly rainfall, 2.97, is below the May average.

New York.—Palermo, Oswego county: monthly rainfall, 5.87, is 3.04 above the May average of the last thirty years. The largest May rainfall of that period, 6.50, occurred in 1864; the smallest, 0.30, occurred in 1870.

North Volney, Oswego county: monthly rainfall, 6.70, is 4.13 above the May average of the last eleven years, and is the largest May rainfall of that period; the smallest, 1.10, occurred in 1876.

Ohio.—Wauseon, Fulton county: monthly rainfall, 5.97, is 2.27 above the May average of the last thirteen years. The largest May rainfall of that period, 6.25, occurred in 1880; the smallest, 1.14, occurred in 1877.

Texas.—New Ulm, Austin county: monthly rainfall, 3.07, is 2.26 below the May average of the last eleven years. The largest May rainfall of that period, 12.25, occurred in 1882; the smallest, 2.94, occurred in 1873.

Vermont.—Woodstock, Windsor county: monthly rainfall, 3.14, or 0.32 above the May average of the last fourteen years. The largest rainfall of that period, 4.43, occurred in 1882; the smallest, 0.62, occurred 1879.

Virginia.—Wytheville, Wythe county: monthly rainfall, 1.50, is 1.51 below the May average of a period of twenty years.

Variety Mills, Nelson county: monthly rainfall, 1.70, is 0.91 below the May average of the last four years.

West Virginia.—Helvetia, Randolph county: monthly rainfall, 4.38, is 0.04 below the May average of the last seven years.

Wisconsin.—Beloit, Rock county: monthly rainfall, 6.42, is the largest May rainfall since 1858.

HAIL.

Arkansas.—Eureka Springs, Carroll county: this place was visited by a violent hail-storm at 5.30 p. m. on the 18th. The hailstones were very large and specimens weighing from six to eight ounces were numerous. Great damage was done to the windows, skylights and roofs of buildings.

California.—Visalia: the storm of the 6th was of unusual severity in this vicinity. The lightning struck in many places, the most serious damage being done near Tulare. Hail accompanied the storm, causing considerable damage. In the western part of Frazier valley the crops were totally destroyed. The width of the hail-storm was from six to eight miles wide, and its northern limit was about five miles south of Visalia.

Colorado.—Denver, 8th: a severe hail-storm began at 9.45 a. m. Scarcely a residence or public building in the city escaped without injury. Vegetables and flower gardens in this city and vicinity were completely destroyed. The hailstones covered the ground in some parts of the city to a depth of twelve inches, the largest stones being one inch in diameter. The losses sustained by ranchmen in the immediate vicinity of Denver is very heavy. The damage resulting from the storm is estimated at \$75,000.

Dakota.—Huron, 9th: large hail fell on this date, eighteen miles north of this place, causing slight damage.

Illinois.—Cairo: the hail-storm which passed over Mound City, Pulaski county, during the night of the 14th-15th, was the severest ever experienced in that locality. More than five hundred panes of window-glass were broken, and vegetable gardens were badly damaged. Hailstones were collected that measured nine inches in circumference.

Polo, Ogle county: on the 18th, hailstones the size of hickory-nuts fell at this place, covering the ground to a depth of one inch.

Indiana.—Carrollton, Hancock county: the hail-storm of the 15th did considerable damage by breaking windows. The fruit and wheat crops were damaged to some extent.

Indianapolis: large hail fell from 5.20 to 5.30 p. m. of the 14th. The hailstones consisted of transparent ice and were of irregular shapes. At Maywood, five miles southwest of Indianapolis, the hail covered the ground to a considerable depth.

Iowa.—Nora Springs, Floyd county, 6th: at 7.15 p. m. of this date hailstones fell, measuring from one to one and one-half inches in diameter.

Muscatine, Muscatine county: A severe hail-storm occurred in Lake township on the 9th, the hailstones being two inches in diameter.

Michigan.—Grand Haven: during the thunder-storm of the 9th, hailstones the size of hazel-nuts fell from 5.45 to 5.47 p. m.

Port Huron, 14th: during the storm of this date hailstones the size of pigeons' eggs fell, covering the ground to a depth of two inches.

Missouri.—Booneville, Cooper county: at 3.30 p. m. of the 8th, a wind and rain storm, accompanied by considerable hail, visited this place. No serious damage was done in this locality.

Cape Girardeau, Cape Girardeau county: at 5.30 p. m. of the 14th, a severe hail-storm visited this place, the hailstones being about the size of hickory-nuts. Considerable damage was done to the fruit-trees, and a number of skylights were broken. **Clarksville, Pike county:** at 5.30 p. m., on the 18th, the most severe hail-storm ever experienced at this place, passed over this locality. The storm was of about thirty minutes' duration, a greater part of which time hailstones fell as large as hens' eggs and some were found to measure seven and eight inches in circumference. Great damage was done to roofs, skylights, windows, and street-lamps. The young fruit and foliage of trees were destroyed, gardens were entirely ruined, and the wheat and corn crops were seriously injured. A number of persons suffered bodily injury from the falling hailstones. The storm came from the southwest and passed off to the east.

Nebraska.—Crete, Saline county: during the afternoon of the 1st, a violent hail-storm visited this place. Some of the hailstones were very large, the average being one inch in diameter. The storm continued for nearly twenty minutes, doing damage to all kinds of vegetation. The hail clogged all of the water-courses, causing the water to overflow many cellars and basements.

Ohio.—Dayton: a hail-storm of unprecedented severity in this locality occurred on the afternoon of the 14th. The hail-

stones measured almost one inch in diameter, covering the streets in places to depths of several inches.

Pennsylvania.—Scranton: a severe hail-storm visited this section during the evening of the 4th. A large amount of property was damaged. Several buildings were struck by lightning during the storm.

Tennessee.—Jackson, Madison county: during the night of the 29–30th, the country southwest of this place was visited by a most severe hail and rain storm. It came from the north-west, striking near Gadsden, Crockett county. All cotton, corn, and fruit in the path of the storm, for miles, were destroyed. Birds and poultry were killed in large numbers by hailstones, which were as large as hens' eggs, and covered the ground to a depth of three inches.

Texas.—Galveston: reports from Terrell, Kaufmann county, state that a severe hail-storm occurred at that place during the evening of the 14th. The hailstones were unusually large, some of which penetrated the roofs of buildings.

Wisconsin.—Sussex, Waukesha county: at 10.50 p. m. of the 2d, a severe hail and thunder storm of five minutes' duration passed over this station. On the north and east sides of the buildings the hailstones covered the ground to a depth varying from four to six inches, the largest measuring one inch in length and one-half inch in diameter. At Waukesha, nine miles south, the storm was more severe, damaging buildings and orchards to the extent of \$10,000.

Beloit, Rock county: at 10.40 p. m. on the 25th, hailstones fell measuring three inches in circumference.

A heavy hail-storm occurred at Mukwanago, Waukesha county, on the 25th, causing considerable damage.

Hail-storms of less violence were reported from the various states and territories as follows:

Arizona.—Prescott, 7th, 18th.

Colorado.—Colorado Springs, 8th; Fort Garland, 17th; West Las Animas, 28th.

Dakota.—Fort Randall, 2d; Morriston, 7th; Fort Lincoln, 9th, 26; Fort Yates, 10th; Tobacco Garden, 16th; Fort Meade, 26th, 29th.

District of Columbia.—West Washington, 5th, 14th, 21st; Washington, 21st.

Idaho.—Fort Lapwai, 7th.

Illinois.—Chicago, 3d; Polo, 2d, 3d, 18th; Anna, 15th; Edgington, 18th; Bunker Hill, 19th; Morrison, 27th.

Indiana.—Indianapolis, 14th; Griffin Station, 14th, 19th, 26th; Noblesville, 14th; Logansport, 14th, 19th, 27th; Wabash, 14th, 19th; Vevay, 27th, 28th.

Iowa.—Des Moines, 3d; Muscatine, 3d, 9th; Humboldt, 7th, 8th, 10th, 13th; West Bend, 9th; Ames, 9th, 28th; Nora Springs, 6th; Indianola, 6th; Davenport, 18th; Burlington, 27th; Dubuque, 27th.

Kansas.—Leavenworth, 9th; Holton, 13th; Lawrence, 13th; Emporia, 13th; Topeka, 13th; Fort Scott, 13th.

Kentucky.—Bowling Green, 14th.

Maine.—Eastport, 10th.

Maryland.—Sandy Springs, 5th.

Massachusetts.—Williamstown, 23d.

Michigan.—Milwaukee, 2d, 18th; Swartz Creek, 3d, 14th; Lansing, 3d, 14th; Grand Haven, 9th; Fort Brady, 9th; Ionia, 14th; Hillsdale, 14th; Port Huron, 14th; Detroit, 21st, 27th; Traverse City, 18th; Northport, 25th.

Montana.—Fort Maginnis, 23d; Fort Keogh, 25th.

Nebraska.—Omaha, 1st, 3d; Sutton, 2d; De Soto, 2d, 14th, 24th; Clear Creek, 1st, 8th, 13th; Milford, 7th; Genoa, 2d, 7th, 8th, 9th, 17th; Stockham, 9th, 13th, 20th; North Platte, 8th, 26th; Red Willow, 31st.

New Hampshire.—Antrim, 10th.

New Jersey.—Freehold, 8th.

New Mexico.—Fort Union, 6th, 16th; Santa Fé, 17th.

New York.—Albany, 10th; Menand Station, (near Albany), 10th, 28th; Friendship, 14th; North Volney, 28th; Palermo, 28th.

North Carolina.—Brevard, 15th; Charlotte, 5th; Weldon, 15th; Kittyhawk, 15th; New River, 15th.

Ohio.—Toledo, 14th; Cleveland, 14th; Margaretta, 14th; Westerville, 14th, 27th; Bethel, 21st, 27th; Cincinnati, 27th; Jacksonburg, 27th, 28th; College Hill, 29th.

Oregon.—Albany, 17th; Portland, 17th; Roseburg, 17th.

Pennsylvania.—Fallsington, 8th; Wellsboro', 10th, 14th; Leetsdale, 14th; Williamsport, 24th.

South Carolina.—Charleston, 12th.

Tennessee.—Memphis, 9th, 14th; Knoxville, 15th, 29th.

Texas.—Indianola, 24th; Eagle Pass, 24th.

Vermont.—Lunenburg, 28th.

Virginia.—Wytheville, 5th; Variety Mills, 5th; Fort Myer, 5th, 21st; Norfolk, 14th, 15th; Johnstown, 27th.

Wisconsin.—Embarras, 2d; Sussex, 2d, 18th; Ripon, 6th; La Crosse, 6th, 27th; Beloit, 18th, 25th.

Wyoming.—Fort Washakie, 1st.

In the following table are shown the greatest and least numbers of rainy (upon which rain fell) and cloudy days; the greatest and least percentages of mean relative humidity; and the highest and lowest dew-point means, as reported from the various districts, for the month of May, 1883:

Districts.	Rainy days.	Cloudy days.	Rel. humidity. *	Dew-point.
			Percentages.	
New England.....	From 10 to 18	From 2 to 10	From 65.8 to 81.8	From 38.5 to 46.8
Middle Atlantic states.....	" 6 " 16	" 3 " 12	" 52.1 " 81.5	" 42.5 " 56.4
South Atlantic states.....	" 7 " 15	" 1 " 13	" 56.8 " 81.5	" 50.8 " 61.3
Florida peninsula.....	" 6 " 9	" 1 " 7	" 68.7 " 70.3	" 62.7 " 68.5
East Gulf.....	" 7 " 9	" 1 " 5	" 68.0 " 72.0	" 55.7 " 63.5
West Gulf.....	" 5 " 13	" 1 " 8	" 63.6 " 70.9	" 55.6 " 67.9
Ohio valley.....	" 15 " 17	" 2 " 12	" 61.7 " 67.7	" 45.2 " 51.9
Tennessee.....	" 9 " 19	" 5 " 9	" 65.0 " 67.0	" 50.6 " 56.1
Lower lakes.....	" 18 " 24	" 10 " 16	" 64.8 " 73.8	" 40.8 " 44.3
Upper lakes.....	" 13 " 25	" 7 " 15	" 61.5 " 75.3	" 30.6 " 41.7
Extreme northwest.....	" 7 " 12	" 3 " 7	" 60.0 " 71.8	" 34.7 " 38.2
Upper Mississippi valley.....	" 10 " 23	" 6 " 16	" 60.4 " 71.1	" 38.9 " 47.7
Missouri valley.....	" 15 " 17	" 7 " 15	" 62.0 " 73.8	" 41.2 " 46.3
Northern slope.....	" 5 " 18	" 3 " 10	" 58.5 " 85.4	" 30.7 " 42.8
Middle slope.....	" 5 " 14	" 3 " 10	" 46.0 " 57.1	" 31.7 " 44.2
Southern slope.....	" 4 " 9	" 2 " 6	" 63.5 " 64.9	" 56.5 " 56.9
Southern plateau.....	" 1 " 7	" 0 " 6	" 29.7 " 41.9	" 20.7 " 35.2
Middle plateau.....	" 2 " 6	" 3 " 5	" 40.6 " 46.5	" 31.2 " 31.3
Northern plateau.....	" 5 " 13	" 3 " 11	" 51.1 " 68.7	" 29.3 " 43.9
North Pacific.....	" 9 " 13	" 7 " 13	" 63.8 " 77.7	" 43.0 " 46.1
Middle Pacific.....	" 9 " 12	" 5 " 12	" 59.6 " 75.8	" 40.6 " 55.6
South Pacific.....	" 0 " 8	" 0 " 6	" 41.8 " 71.7	" 46.6 " 51.0
Mt. Washington, N. H.....	Twenty-one	Two	88.4	30.8
Pike's Peak, Col.	Thirteen	Six	84.6	15.6

* Relative humidity corrected for altitude.

SNOW.

The dates on which snow is reported to have fallen in the various states and territories are as follows:

California.—Fort Bidwell, 13th, 17th.

Colorado.—Pike's Peak, 3d, 8th, 9th, 10th, 12th, 13th, 17th to 20th, 24th, 25th, 29th, 30th; Denver, 29th.

Dakota.—Fort Sully, 1st; Fort Meade, 1st to 4th, 10th, 13th, 14th; Fort Hale, 1st, 2d; Huron, 1st, 2d, 3d; Fort Stevenson, 1st; Rapid City, 2d, 13th; Deadwood, 2d, 3d, 4th, 13th, 16th, 29th, 30th; Fort Yates, 3d, 10th; Fort Bennett, 2d, 3d, 4th; Fort Sisseton, 2d, 3d; Alexandria, 3d; Tobacco Garden, 5th, 6th; Fort Totten, 6th.

Idaho.—Eagle Rock, 3d; Miner's Camp, 1st.

Illinois.—Chicago, 21st; Tuscola, 21st; Champaign, 21st.

Indiana.—Griffin station, 21st, 22d; Indianapolis, 21st.

Maine.—Eastport, 15th.

Michigan.—Marquette, 2d, 3d, 9th, 12th, 20th; Port Huron, 2d; Fort Brady, 3d, 9th, 12th, 20th; Alpena, 3d, 20th; Detroit, 21st, 22d; Thornville, 22d.

Minnesota.—Moorhead, 1st; Duluth, 1st, 6th.

Montana.—Snow fell generally throughout the territory on the 1st and 2d; Fort Keogh, 3d; Fort Ellis, 3d, 4th, 18th, 28th, 29th; Fort Shaw, 4th, 5th, 9th; Fort Benton, 4th; Helena, 4th; Fort Assiniboine, 5th; Fort Maginnis, 13th, 14th.

Nebraska.—Fort Niobrara, 2d.

Nevada.—Pioche, 1st, 7th, 18th.

New Hampshire.—Summit of Mount Washington, 14th, 15th.

New Mexico.—Santa Fé, 17th.

New York.—Rochester, 22d.

Ohio.—Bethel, 21st; Wauseon, 21st, 22d; Cincinnati, 21st; Columbus, 21st; Toledo, 21st, 22d; Springfield, 21st.

Tennessee.—Chattanooga: snow was reported to have fallen on Lookout mountain during the morning of 22d.

Utah.—Salt Lake City, 2d.

West Virginia.—Helvetia, 22d.

Wyoming.—Fort Bridger, 2d, 29th; Cheyenne, 2d, 3d, 9th, 25th, 29th; Fort Washakie, 2d, 12th, 28th, 29th.

LARGEST MONTHLY SNOWFALLS.

[Expressed in inches.]

The following are the largest monthly snowfalls reported from the various states and territories during the month:

California.—Cisco, 55; Emigrant Gap, 33; Summit, 33.

Colorado.—Pike's Peak, 36 on the ground at end of the month, 28 of which fell during the month of May; Fort Lewis about 7; Fort Garland about 4.

Dakota.—Deadwood, about 30; Huron, 6.7.

Indiana.—Griffin's station, about 4; Rising Sun, 3.

Montana.—Helena, 5.7; Fort Maginnis, 6.2.

Nevada.—Truckee, 9.5; Boca, 6; Toana, 5.

New Hampshire.—On the summit of Mount Washington, 6.4, trace remaining on the ground at end of the month.

Ohio.—Toledo, 6.

Wyoming.—Fort Washakie, 16; Cheyenne, about 9; Fort Bridger, 7.8.

SLEET.

Fort Brady, Michigan, 2d, 10th.

Fort Niobrara, Nebraska, 3d.

North Lewisburg, Ohio, 21st.

Toledo, Ohio, 21st.

Saint Paul, Minnesota, 2d.

Mount Washington, New Hampshire, 5th to 8th, 10th to 24th, 25th.

Fort Totten, Dakota, 6th.

COTTON REGION REPORTS.

Temperature and rainfall observations in the cotton districts were continued during the month of May, 1883. The averages for the various districts, as determined from the observations made by the stations published in the REVIEW for April, 1882, are given in table below.

Meteorological Record of the Cotton Districts for the month of May, 1883.

Districts.	Average rainfall in inches.	Temperature.		Extremes.	
		Mean of the maxima.	Mean of the minima.	Highest.	Lowest.
New Orleans.....	3.95	84.8	62.9	100	30
Savannah.....	3.60	84.4	59.3	97	32
Charleston.....	5.06	82.7	57.8	90	40
Atlanta.....	2.58	80.7	56.5	92	34
Wilmington.....	2.33	82.0	54.6	92	33
Memphis.....	4.59	80.3	55.4	93	37
Galveston.....	2.18	86.6	66.2	99	42
Vicksburg.....	2.63	82.8	59.4	95	38
Montgomery.....	2.60	84.2	56.0	94	31
Augusta.....	2.70	83.5	59.1	95	31
Little Rock.....	4.24	82.0	54.6	93.3	33
Mobile.....	2.94	85.3	58.6	98	30

WINDS.

The prevailing directions of the wind for the month of May, 1883, at the Signal-Service stations are shown on chart iii. by arrows flying with the wind. On the California coast, the prevailing winds were westerly; in the north Pacific coast region, northerly; in the Gulf states, southerly and southeasterly; along the Carolina coast, southwesterly, except northeast at Kittyhawk; on the middle Atlantic coast, easterly and southerly; New England coast, southerly and southwesterly; lower lake region, westerly; in the upper lake region, upper Mississippi and Missouri valleys, they were mostly from the north and northwest.

TOTAL MOVEMENTS OF THE AIR.

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Block Island, R. I.....	9,725	New London, Conn.....	4,557
Middle Atlantic states.....	Del. Breakwater, Del.....	11,980	Lynchburg, Va.....	3,496
South Atlantic states.....	Hatteras, N. C.....	13,978	Augusta, Ga.....	2,801
Florida peninsula.....	Punta Rassa.....	7,264	Sanford.....	4,105
East Gulf.....	Starkville, Miss.....	6,327	Montgomery, Ala.....	3,591
West Gulf.....	Indianola, Tex.....	10,838	Little Rock, Ark.....	4,325
Ohio valley.....	Louisville, Ky.....	6,818	Pittsburg.....	3,968
Tennessee.....	Nashville.....	5,549	Chattanooga.....	4,549
Lower lakes.....	Rochester, N. Y.....	9,667	Cleveland, Ohio.....	6,783
Upper lakes.....	Milwaukee, Wis.....	9,653	Marquette, Mich.....	6,532
Extreme northwest.....	Moorhead, Minn.....	9,227	Saint Vincent, Minn.....	6,857
Upper Mississippi valley.....	Saint Louis, Mo.....	9,362	Dubuque, Ia.....	4,023
Missouri valley.....	Huron, Dak.....	8,944	Omaha, Neb.....	6,626
Northern slope.....	North Platte, Neb.....	9,488	Deadwood, Dak.....	2,846
Middle slope.....	Fort Elliott, Texas.....	11,728	Denver, Colo.....	4,883
Southern slope.....	Fort Concho, Texas.....	8,119	Colman City, Texas.....	6,918
Southern plateau.....	Santa Fe, N. M.....	9,362	Tucson, Ariz.....	3,215
Middle plateau.....	Pioche, Nev.....	6,412	Salt Lake City, Utah.....	3,350
Northern plateau.....	Eagle Rock, Idaho.....	7,252	Lewiston, Idaho.....	2,481
North Pacific.....	Portland, Oregon.....	4,284	Olympia, Wash. T.....	1,408
* Middle Pacific.....	San Francisco, Cal.....	7,176	Sacramento, Cal.....	5,207
South Pacific.....	San Diego, Cal.....	5,086	Visalia, Cal.....	3,102

* No record at Cape Mendocino, Cal.

On the summits of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the total movements of the air were 25,410 and 16,762 miles, respectively.

HIGH WINDS.

On the summit of Mount Washington, maximum velocities of fifty miles per hour or more were of daily occurrence, with the exception of the 1st, 4th, 5th, 15th, 18th, and 21st. The highest velocities recorded at this station as follows: 78 nw., 8th; 76 nw., 9th; 84 sw., 10th; 90 nw., 11th; 76 nw., 13th; 76 sw., 29th; maximum for the month, 96 sw., 31st. The following high velocities were reported from Pike's Peak, Colorado: 68 sw., 1st; 52 nw., 4th; 64 sw., 5th; 51 sw., 6th; 78 sw., 8th (maximum for month); 52 nw., 23d; 58 sw., 24th; 50 nw., 26th; 56 nw., 27th; 56 nw., 28th; 64 n., 31st.

Other stations reporting velocities of fifty miles or more per hour, are as follows: Fort Assiniboine, Montana, 52 w., 31st; Mackinaw City, Michigan, 52 e., 10th; Delaware Breakwater, Delaware, 50 n., 15th; Hatteras, North Carolina, 56 ne., 2d; Portsmouth, North Carolina, 64 ne., 2d.

LOCAL STORMS.

The most violent local storms and tornadoes of the month occurred in connection with the passages of the barometric depressions traced as numbers v. and vi. on chart i. Those which were associated with number v. were most violent in eastern Kansas and Missouri, and occurred on the afternoon of the 13th, while the centre of depression was near central Nebraska. The tornadoes occurring in connection with number vi. were numerous and severe. They occurred during the afternoon and evening of the 18th in the states of Illinois, Indiana, Iowa, Missouri, and Wisconsin. The barometric depression mentioned in connection with these storms, which are described in detail under "areas of low-pressure," were traced as follows:

Number v. was central in eastern Colorado on the morning of the 13th, and moved in an easterly direction, disappearing off the middle Atlantic coast on the afternoon of the 15th. Number vi. was first located near central Wyoming on the morning of the 17th; it moved northeastward over the upper lakes and Canadian provinces, and was last observed on the morning of the 21st over the Gulf of St. Lawrence.

Brief description of the local storms and tornadoes of May, 1883, are given below, under the heading of the various states in which they occurred.

Alabama.—A storm of great violence passed to the north and west of Headland, Henry county, during the evening of the 20th, destroying a number of buildings and blowing down many trees and fences.

Arkansas.—Eureka Springs, Carroll county, 18th: a tornado occurred during the evening of this date, first striking a point about five miles southeast of this place, where it cut a path, one-fourth of a mile in width, through a dense forest, and destroyed several buildings.